IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Application of:	Group Art Unit: 2626
REZNIK, Yuriy A.	Confirmation No.: 1483
Application No.: 10/826,469	Examiner: HE, Jialong.
Filed: April 16, 2004	
For: DIGITAL AUDIO SIGNAL COMPRESSION METHOD AND APPARATUS	

REPLY BRIEF

TO THE COMMISSIONER FOR PATENTS:

This Reply Brief is filed in response to the Examiner's Answer of January 27, 2010

("Examiner's Answer") and pursuant to 37 C.F.R. § 41.41.

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I. STATUS OF THE CLAIMS

Claims 1-31 are pending and currently stand rejected under 35 U.S.C. 103. Appellant appeals the rejections of each of Claims 1-31.

II.   GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-31 are pending. Claims stand rejected under 35 U.S.C. §103 from a Final Office Action dated September 17, 2008. In the Final Office Action, claims were rejected as follows:

- Claims 19, 26, and 29 were objected to because of informalities;

- Claims 1-4, 7-15, and 19-31 were rejected as being unpatentable under 35 U.S.C. § 103(a) over Robinson's Technical Report, "SHORTEN: Simple lossless and near-lossless waveform compression" (hereinafter "*Robinson*") in view of Published U.S. Patent Application Pub. No. 2002/0094535 to Nadon et al (hereinafter "*Nadon*");

- Claims 5-6 were rejected as being unpatentable under 35 U.S.C. § 103(a) over *Robinson* in view of *Nadon* and further in view of Hasegawa-Johnson et al.'s paper, "Speech coding: fundamentals and applications" December 2002 (hereinafter "*Johnson*");

- Claims 16 and 18 were rejected as being unpatentable under 35 U.S.C. § 103(a) over *Robinson* in view of *Nadon* and further in view of U.S. Patent No. 6,094,636 to Kim (hereinafter "*Kim*");

- Claim 17 was rejected as being unpatentable under 35 U.S.C. § 103(a) over *Robinson* in view of *Nadon* and further in view of U.S. Patent No. 3,694,813 to Loh (hereinafter "*Loh*").

After the Final Office Action, but prior to this Appeal, Claims 19, 26, and 29 were amended. An Advisory Action was issued dated November 24, 2008, wherein rejections of Claims 1-31 under 35 U.S.C. §103 were maintained, but the objection to Claims 19, 26,

and 29 was withdrawn. A Notice of Panel Decision from Pre-Appeal Brief Review was

issued August 26, 2009, wherein rejections of Claims 1-31 under 35 U.S.C. §103 were

further maintained.

The issues to be reviewed in this appeal are as follows:

1. Whether the Final Office action erred in rejecting Claims 1-4, 7-15, and 19-31 under 35 U.S.C. §103(a) over *Robinson* in view of *Nadon*.

2. Whether the Final Office action erred in rejecting Claims 5-6 under 35 U.S.C. §103(a) over *Robinson* in view of *Nadon* and *Johnson*.

3. Whether the Final Office action erred in rejecting Claims 16 and 18 under 35 U.S.C. §103(a) over *Robinson* in view of *Nadon* and *Kim*.

4. Whether the Final Office action erred in rejecting Claim 17 under 35 U.S.C. §103(a) over *Robinson* in view of *Nadon* and *Loh*.

Appellant respectfully submits that Claims 1-31 are allowable for at least the reasons set out in the Appeal Brief. In addition, Appellants respectfully submit that Claims 1-31 are allowable for the additional reasons set out below.

Issue 1: Claims 1-4, 7-15, and 19-31 are patentable over Robinson in view of Nadon.

Appellants further respectfully submit that the Final Office Action erred in rejecting Claims 1-4, 7-15, and 19-31 because neither *Robinson* nor *Nadon*, alone or combined, teaches or even suggests each element of the claims.

For example, Appellant respectfully submits that *Robinson* neither teaches nor suggests a method of compressing audio data for transmission as claimed in Claim 1:

> applying a prediction filter to **a unit of audio signal data**;
> **determining a distribution** substantially representative of residual data generated as part of said **applying of a prediction filter to the unit of audio signal data**, wherein determining a distribution comprises determining a plurality of statistical measures, including at least one of a skewness of the distribution, and a kurtosis of the distribution; and
> transmitting in substance the unit of audio signal data to a recipient, **utilizing the determined distribution to assist in reducing the amount of data having to be transmitted**.

Thus, all of the elements of Claim 1 relate to a specific "unit of audio data." First, a prediction filter is applied to an indicated "unit of audio data." Residual data is generated as part of applying the prediction filter to the indicated unit of audio data, and a distribution that substantially represents that specific residual data is determined. Thus, the claimed "distribution" is **determined** for the **specific residual data** that is generated as part of applying the prediction filter to the specific "unit of audio data." This specifically-determined "distribution" is used to reduce the amount of data having to be transmitted to transmit in substance the indicated "unit of audio data."

In the Examiner's Answer at page 4, it is asserted that *Robinson* discloses a method comprising "**determining a distribution** substantially representative of residual data generated as part of said applying of a prediction filter to the unit of audio signal data," as claimed in Claim 1. The Examiner's Answer further asserts that *Robinson* discloses "**utilizing the determined distribution** to assist in reducing the amount of data having to be transmitted," also as Claimed in Claim 1. In support of these assertions, the Examiner's Answer cites to *Robinson* page 4 § 3.3 (Residual Coding), which includes Figs. 2-3.

However, *Robinson* actually states almost the opposite of the assertions in the Examiner's Answer. Specifically, *Robinson* teaches a method that assumes that all residual data has a **Laplacian distribution**, regardless of the specific waveform from which the residual data is generated. *See* page 8, § 5 ("The previous sections have demonstrated that low order linear prediction followed by Huffman coding **to the Laplace distribution** results in an efficient lossless waveform coder."); page 9 § 6 ("The use of a simple linear predictor followed by Huffman coding **according to the Laplacian distribution** has been found to be appropriate for the examples studied."); page 15 ("**It is assumed the signal has the Laplacian probability density function** of exp(-abs(x))."") (emphasis added). In other words, *Robinson* explicitly states that his method does not code a specific waveform by determining a specific distribution representative of specific residual data generated from that specific waveform, as claimed.

Thus, Appellant respectfully submits that the Examiner's Answer has mischaracterized the teachings of *Robinson*. In § 3.3 (relied on by the Examiner's Answer), *Robinson* merely describes research he carried out when developing his waveform compression technique. *Robinson's* Figs 2-3 merely illustrate residual data collected from his

analysis of 24 seconds of audio comprising ten utterances from one speaker. *See* page 2 § 3

("The recordings used as examples in section 3 and section 5 are from the TIMIT corpus....

All ten utterances from speaker fcjf0 are used which amount to a total of 24 seconds....").

Based on the residual data generated from those ten utterances, *Robinson* teaches that the

Laplacian distribution is substantially representative of residual data in general, regardless of

the waveform from which it is generated.

In light of the above discussion, it is apparent that the Examiner's Answer further

mischaracterizes *Robinson* on pages 22-23 when it asserts that *Robinson* discloses a "method

of lossless compressing audio data by modeling the prediction residual data with a Gaussian

or Laplace distribution." However, *Robinson* never teaches that a Gaussian distribution is

used to model residual data. The Gaussian probability density function (p.d.f.) appears to be

illustrated in Figs. 2-3 merely to show that the Laplacian p.d.f. is a better fit to the observed

data. *See* page 5 ("[Figs. 2-3] demonstrate that the Laplacian p.d.f. fits the observed

distribution very well"). Moreover, as discussed above, *Robinson* repeatedly states that a

Laplacian distribution is assumed for the residual data generated from every waveform. *See*

page 8, § 5; page 9 § 6; page 15.

Furthermore, contrary to the Examiner's Answer on page 22, *Robinson* does not

"disclose[] determining a plurality of statistics measures such as mean value and variance of

Gaussian function and Laplace function." On the contrary, *Robinson* never discloses that

"determining a distribution [substantially representative of residual data generated as part of

said applying of a prediction filter to the unit of audio signal data] comprises **determining a**

plurality of statistical measures," as claimed in Claim 1. At most, *Robinson* discloses that a

p.d.f. is merely assumed to be Laplacian and that "[t]he optimal number of low order bits to

be transmitted directly is linearly related to the variance of the signal." *See* page 7. The

Examiner's Answer appears to base its assertion that *Robinson* teaches determining a "mean

value" on nothing more than the fact that Figs. 2-3 show the x-axis with values varying on

either side of zero. Even if the mean value of the residual data plotted in Figs. 2-3 were zero,

Robinson fails to teach or even suggest affirmatively "determining" such a statistical

measure.

Similarly, the Examiner's Answer further mischaracterizes *Robinson* on page 23,

incorrectly asserting that "[b]oth Robinson and Nadon are dealing with a problem of

modeling residual data as a Gaussian (Normal) distribution." On the contrary, as discussed at

length above, *Robinson* merely assumes that the residual data from applying a prediction

filter to an arbitrary waveform will have a Laplacian p.d.f. *See* page 8, § 5; page 9 § 6;

page 15. By contrast, *Nadon* "assume[s] that if the model is correct, the residuals should be

normally distributed," ¶[0057], and employs various techniques to determine if this

assumption is correct. Therefore, the Examiner's Answer incorrectly reaches the conclusion

that *Robinson* and *Nadon* are analogous art.

Moreover, the Examiner's Answer further incorrectly concludes at page 23 that

"[o]ne of ordinary skill in the art would look at Nadon's reference to measure

skewness/kurtosis to verify if a distribution of data is a Gaussian (Normal) distribution." This

conclusion is faulty at least because nothing in *Robinson* even suggests a need to "verify if a

distribution of data is a Gaussian (Normal) distribution." On the contrary, as discussed at

length above, *Robinson* merely assumes that the residual data from applying a prediction

filter to an arbitrary waveform will have a Laplacian p.d.f. *See* page 8, § 5; page 9 § 6;

page 15.

Appellants also take issue with the second paragraph on page 23, in which the Examiner's Answer improperly introduces a new reference to Microsoft Excel. It is unclear whether the Examiner is attempting to introduce a new ground of rejection based on Excel and/or official notice that a "standard statistic measurement can be applied to any data...." Regardless, Appellant respectfully submits that the second paragraph on page 23 is improper and should not be considered at least because the Answer fails to comply with MPEP §1207.03 §I, which requires that "[a]ny new ground of rejection made by an examiner in an answer must be: (A) approved by a Technology Center (TC) Director or designee; and (B) prominently identified in the 'Grounds of Rejection to be Reviewed on Appeal' section and the 'Grounds of Rejection' section of the answer...." Appellants request that the Board disregard the second paragraph on page 23 and that this paragraph play no part in the Board's deliberation and/or decision.

In addition, the Examiner's Answer further mischaracterizes *Robinson* on page 24, incorrectly asserting that "[b]oth Robinson and Nadon are dealing with a problem of modeling residual data as a Gaussian distribution...." On the contrary, as discussed at length above, *Robinson* merely assumes that the residual data from applying a prediction filter to an arbitrary waveform will have a Laplacian p.d.f. *E.g.* page 8, § 5; page 9 § 6; page 15.

For at least the reasons discussed above, Appellant respectfully submits that neither *Robinson* nor *Nadon*, alone or combined, teaches or even suggests that a "distribution" is **determined** for **specific residual data** that is generated as part of applying a prediction filter to a specific "unit of audio data," this specifically-determined "distribution" being used to reduce the amount of data having to be transmitted to transmit in substance the indicated "unit of audio data," as claimed in Claim 1. Independent Claims 19, 26, and 29 recite similar

elements and are allowable by similar reasoning. Claims 2-4, 7-15, and 20-25, 27-28, and 30-31 are allowable at least by dependency.

Issue 2: Claims 5-6 are patentable over *Robinson* in view of *Nadon* and *Johnson*.

As discussed above and in the Appeal Brief, the Final Office Action erred in rejecting Claim 1, from which Claims 5-6 depend. Moreover, *Johnson* fails to remedy any of the above- and previously -discussed defects in the proposed combination of *Robinson* and *Nadon*. Accordingly, Appellant respectfully submits that Claims 5-6 are allowable at least by dependency and/or by similar reasoning.

Issue 3: Claims 16 and 18 are patentable over *Robinson* in view of *Nadon* and *Kim*.

As discussed above and in the Appeal Brief, the Final Office Action erred in rejecting Claims 1 and 14, from which Claims 16 and 18 depend. Moreover, *Kim* fails to remedy any of the above- and previously -discussed defects in the proposed combination of *Robinson* and *Nadon*. Accordingly, Appellant respectfully submits that Claims 16 and 18 are allowable at least by dependency and/or by similar reasoning.

Issue 4: Claim 17 is patentable over *Robinson* in view of *Nadon* and *Loh*.

As discussed above and in the Appeal Brief, the Final Office Action erred in rejecting Claims 1 and 14, from which Claim 17 depends. Moreover, *Loh* fails to remedy any of the above- and previously-discussed defects in the proposed combination of *Robinson* and *Nadon*. Accordingly, Appellant respectfully submits that Claim 17 is allowable at least by dependency and/or by similar reasoning.

VIII.   SUMMARY

For at least the reasons discussed above, in addition to those set out in Appellant's Appeal Brief filed November 13, 2009, Appellants submit that all pending claims are in condition for allowance. Accordingly, early and favorable action allowing all of the pending claims and passing this application to issue is respectfully requested.

We believe the appropriate fees accompany this transmission. If, however, insufficient fee payment or fee overpayment occurs, the amount may be withdrawn or deposited from/to AXIOS Law's deposit account. The deposit account number is 50-4051.

Respectfully submitted,
AXIOS Law

Date: March 26, 2010

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